NS-16 FREEZE REDUCTION

BMP Objectives

- ☒ **Perimeter Control**
- ☐ **Slope Protection**
- ☐ **Borrow and Stockpiles**
- ☒ **Drainage Areas**
- ☐ **Sediment Trapping**
- ☐ **Stream Protection**
- ☐ **Temporary Stabilizing**
- ☐ **Permanent Stabilizing**

Definition and Purpose

Snow and ice accumulations in structures such as ditches and culverts can lead to plugging and subsequently to significant water flows across disturbed areas causing erosion. Frozen culverts can cause water to flow over roadways, destabilizing them. Ice blockage in channels can increase water levels in the channels causing flooding and potentially resulting in significant damage. This BMP involves the use of oversized culverts, dual culverts, elevated culvert outlets, and heat trace to reduce the impacts of freezing weather on culvert effectiveness.

Appropriate Applications

Generally, ice blockage occurs during the winter months and proper slopes and proper installation of standard hydraulic structures reduce freezing. However, in areas where failure could cause significant damage, conservation methods such as the ones described in this BMP may be necessary.

This BMP is appropriate in areas where heavy frost and snow may cause unacceptable failure, such as at or near environmentally hazardous sites, or in locations where failures could be a health hazard or cause unacceptable problems.

Limitations

- This BMP is not applicable in areas with limited access and space to install oversized and/or dual hydraulic structures.
- Elevated culvert outlets in streams should be avoided if fish migration is a concern.
- Heat trace may not be appropriate for remote areas with limited access to electricity.

Design Parameters

- Install oversized culverts to allow for some freezing.
- Install dual culverts with one culvert raised higher in elevation than the other culvert. This will allow water passage through the upper culvert if the lower culvert freezes.

- Install the culvert such that there is a vertical drop of approximately 2 feet at the outlet, which may reduce water freezing within the culvert.
- Install channel freeze protective measures.

Maintenance and Inspection

- Conduct inspections as required by the NPDES permit or contract specifications.
- Disconnect and remove any electrical components when no longer required for freeze reduction.